Commercial buildings are being designed and constructed to meet the latest sustainable design regulations or green building rating systems.

we’re seeing a gap – an engagement gap
“buildings don’t use energy ......
HOK’s Occupant Engagement Program

- gather
- strategize
- educate
- implement
- measure

occupant actions
education
empowerment
communication
behaviors
alignment of goals
tools
consciousness
practices
Community-based social marketing
often most effective • community level • direct contact

vs

Conventional Social marketing
public awareness • limited in ability change behaviour
Community Based Social Marketing Tools

social norms  guide behavior

commitments  are an obligation to fulfillment

prompts  are an aid that reminds to carry out an activity

communications  persuade the adoption of changes in activities

incentives  motivate a more effective fulfillment of an action

barriers  ensures effectiveness of other tools

source | adapted from "Fostering Sustainable Behavior" by Doug McKenzie-Mohr & William Smith

Information Visualization in Commercial Buildings
April 13, 2011
Toronto-Dominion Centre – A Case Study

- Toronto, Ontario in the heart of Canada’s financial district
- designed by Mies van der Rohe and constructed 1967 – 1969
- Commercial Office complex consisting of 6 towers
- 90 Tenant companies – Financial, Legal & Investment Firms
- 21,000 building occupants

Graph:

- An average of 55% of energy use at the Toronto Dominion Centre is attributable to tenant consumption.
- 75% of energy use is attributed to other sources.
Visualizing Information
Demand Profile - TD Centre - TD Bank Tower (TD1)

31-Jan-2011 12:15 AM to 7-Feb-2011 12:00 AM

Date / Time

Information Visualization in Commercial Buildings
April 13, 2011
Visualizing Information?

Abnormal ECG results?
Visualizing Information?

Bad day at the stock market?
Demand Profile - TD Centre - TD Bank Tower (TD1)

31-Jan-2011 12:15 AM to 7-Feb-2011 12:00 AM

- 40% of total energy use during night
- Should be down at 20%
- Additional 20% is due to plug loads
strategize

Information Visualization in Commercial Buildings
April 13, 2011
mission
to act as “the catalyst for change to sustainable green practices and green consciousness” at TD Centre working towards a vision for a future that is “reliable, responsive and environmentally sustainable everyday”
objectives

foundational element in developing & driving engagement program

oversight for all “green” program initiatives

conduit to and representative for larger tenant body

develop & support engagement events

identify educational content needs

alignment with tenant objectives
TDC Green Council Campaigns

CAMPAIGN TOPICS

- Energy & Emissions
- Transportation
- Indoor Environmental Quality
- Water
- Waste
- Procurement
- Programs & Certifications

Energy & Emissions
Tenant Tie-In

- Plug Load Audit
- Lighting Audit
- Set equipment to power save mode
- Set back temperatures
- Light sensors + motion detectors
- Purchase Energy Star rated
- Remove lights in vending machines
- IT - reduce screen brightness
- IT - Laptops instead of desktops
- IT - Virtualization
- IT - Spam policy - reduce junk mail
- Electronic faxing
- Daylight cleaning
- Replace Incandescent bulbs

Energy & Emissions
Occupant Support

- Shut off monitor + computer
- Turn lights off
- Unplug chargers
- Allow temperature setbacks
- Pull down blinds
- Use energy saving search Engine
- Telecommute
- Avoid multi-tang
- Turn off task lighting

Information Visualization in Commercial Buildings
April 13, 2011
TDC Green Council Materials

Information Visualization in Commercial Buildings
April 13, 2011
TDC Green Council Materials

Information Visualization in Commercial Buildings
April 13, 2011
implement
Awareness Campaign
July 2010 – October 2010

Avoid the drip. Report it.
A leaky faucet can waste up to 7,500 litres of water a year! That’s the equivalent of 3,750 large bottles of pop. Please report a leaking faucet!

It’s not a sin. Put it all in the bin.
Single-stream recycling means no sorting on your part. Feel free to put all recyclables in the same container. They will get sorted off-site.

Turn me off!
Turn off your monitor and computer at night. You are conserving energy and saving $100 per workstation per year.
ENERGY.
everyone is talking about it
Together we can do this.

As one of Canada's leading buildings in sustainable practices, the TD Centre is continuing the drive to reduce our collective energy consumption.

This week the TD Centre will be launching our ‘Switch the Habit’ Energy Campaign, to remind people that changing the little behaviours can make a big difference.

By turning off your computers, monitors and office lights every night we can reduce the TD Centre's energy usage by up to 30%. It’s that easy!

Keep an eye out for posters and elevator messaging in the upcoming months and join us in preserving our energy resources. Switch your energy consumption habits and help us make the TD Centre a better place to work.

Switching the Habit

- 412,000 kWh of electricity
- 47 trees
- 1,200,000 km driven by cars

If every tenant at the TD Centre reduced their lighting operations by 1 hour we would collectively save...
TDC Energy Campaign – Building Lighting Op Hours

LIGHTING SCHEDULE – Turning back the lights

TD Centre is encouraging tenants to evaluate their lighting hours and consider voluntary opt-in to a reduced schedule as an effort to conserve energy.

“Electricity demand for commercial buildings accounts for 40% of total electrical usage.”

Buildings account for 40% of global carbon dioxide emissions. About half of the energy demand for commercial buildings accounts for electric lighting (40%), followed by office equipment (20%) and then cooling needs (15%).

Because lighting is the largest energy drain in commercial buildings, feeling simple yet effective approaches to reduce demand is fairly easy. A first step would be to reduce electrical lighting needs. When walking through the downtown core at night, buildings are lit up too often. Thus, there is no one actively in the building. Adjusting building hours to meet business requirements, yet avoiding unnecessary, can have a huge impact. For example, if a tenant has a typical base building lighting schedule of 6 am – 6 pm reduced to 8 am – 5 pm, the tenant would save an average of 412,000 kWh of electricity or 47 acres of trees or 1,200,000 km driven by car.

If every tenant at the TD Centre (226 stores, 4.3 million sq. ft.) reduced their lighting schedule by 1 hour each day, we would collectively save

412,000 kWh of electricity
or
47 acres of trees
or
1,200,000 km driven by car.

ACTION | Opt in to reduced building lighting hours

Information Visualization in Commercial Buildings
April 13, 2011
TDC Energy Campaign – Lighting Retrofits

LIGHTING RETROFITS - Stepping into a new light
TDC Tenant Case Study | Fraser Milner Casgrain LLP Energy Efficient Lighting

Frazier Milner Casgrain LLP (FMC) is a low firm with over 500 lawyers in six offices across the country. FMC provides legal counsel to both public and private clients of all sizes. FMC also offers support to new law professionals as well as the local community. In line with its value of contributing to the community, a commitment to forward thinking environmental initiatives informed the decision to pursue LEED for Commercial Interiors (CDI) in their new space at the TD Centre. The following is a case study of how Fraser Milner Casgrain stepped into a new world of lighting and helped the environment along the way.

“LEED Certification reflects and embraces our core values”
— John Ewalt | FMC

BOMA – incentives for tenants

CASE STUDY | Toronto Law Firm

A Downtown Law Firm took advantage of the original BOMA CDI Program, which began with a mandatory energy audit to determine their performance baseline. A lighting retrofit plan was developed for the installation of 230 motion sensors in boardrooms and offices. Both the energy audit and capital costs where eligible for the BOMA incentives. This small, but significant action resulted in energy and cost savings.

Savings = 450,000 kWh & $45,000 annually

ENERGY – Lighting Initiatives

After heating, lighting is the largest consumer of energy in a commercial space. Over one quarter of all energy consumed is used just to keep the lights on. This represents a great opportunity for energy and cost savings. Lighting is considered the low-hanging fruit of energy reduction measures with return on investment typically less than 10 years. As electricity costs increase, payback could be achieved even sooner. Lighting is also where Landlord and Tenant can work together to achieve mutually beneficial results.

In the following pages, you will find helpful information about fellow tenants, the state of lighting technology, financial incentives and communications your organization can use in encouraging employees to:

- Enclosed, you will find:
- Information about build a solid case
- Included in this:
- TD Energy
- Ormil
- Sylvania
- General
- Company
- Company
- Case
- Energy
- Maintenace
- OSRAM SYLVANIA – A vision for the future

When it comes to sustainable team work, TD Centre and its Tenants are a great example. Many Tenant/Landlord collaborations for lighting retrofit have already resulted in reduced energy demands. TD Centre would like to continue these efforts by keeping tenants informed and support those who may be considering lighting changes in the near future.

The following report is provided by Osram Sylvania, an industry leader in creating energy efficient lighting solutions, it identifies opportunities for improving efficiency in your non-base-building lights while addressing evolutions in technology, in particular the increased use of LEDs in office settings.

If you would like to discuss a lighting retrofit project in your space, contact your Tenant Relations Representative.

ACTION | Plan for high efficiency lighting upgrades of non-base building lighting

Information Visualization in Commercial Buildings
April 13, 2011
TDC Energy Campaign – Midnight Audit Reports

**Midnight Audit Summary**

The midnight audit was carried out over a three-night period of time by Camille Industries Inc. The audit involved visiting all floors of all TD Centre towers and documenting tenant energy use through measurement and visual inspection.

The goal of the midnight audit was to identify opportunities for energy savings. Equipment operations, manual lighting levels, and office equipment left on were documented and savings reported.

**Annual Energy Saving Opportunities in Your Space**

- Annual Savings
  - Tenant Equipment & Elevator Lobby Lighting & Other

**Current Lighting Schedule**

- Weekday On
- Weekday Off
- Saturday On/Off
- Sunday On/Off
- Weekly Total
- Monthly Total

**Lights Not Controlled**

<table>
<thead>
<tr>
<th>Tower</th>
<th>Lights Not Controlled (kWh)</th>
<th>Tenant Equipment (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tower 1</td>
<td>64,681</td>
<td>472,383</td>
</tr>
<tr>
<td>Tower 2</td>
<td>14,636</td>
<td>223,852</td>
</tr>
<tr>
<td>Tower 3</td>
<td>20,850</td>
<td>135,990</td>
</tr>
<tr>
<td>Tower 4</td>
<td>396,344</td>
<td></td>
</tr>
<tr>
<td>Tower 5</td>
<td>20,941</td>
<td>70,910</td>
</tr>
<tr>
<td>Tower 6</td>
<td>440,004</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>121,108</strong></td>
<td><strong>1,749,383</strong></td>
</tr>
</tbody>
</table>

**ACTION** | Review audit results and take action

Information Visualization in Commercial Buildings
April 13, 2011
ELECTRONICS MYSTERY AUDIT

"We’re building sustainability together™ at the TD Centre and you're invited!"

You’ve heard about all the great initiatives already underway as part of the Energy Campaign and its focus on reducing energy consumption. Now you and your organization have the opportunity to become directly involved.

Enclosed is all you will need to organize your own Electronics Mystery Audit. This is not only a way to identify opportunities for energy savings within your own organization, but it also a great way to engage employees that are eager to make a difference. You can also win an iPad by doing your part to help conserve energy at the TD Centre! Just be sure to get all eligible ballots in and audits complete before April 30, 2011.

The GOAL:
Bring awareness to the sources of energy use and engage tenant occupants to complete simple tasks that contribute to energy use reduction.

What’s NEXT?
☐ Review this package. If you have any questions, please contact your Tenant Relations Representative for clarification before creating and meeting with your Audit Tiger Team.
☐ Identify areas/floors/departments in your organization where an Electronics Mystery Audit would be beneficial.
☐ Communicate the Electronics Mystery Audit to your organization's leadership for their awareness and support.
☐ Create an audit Tiger Team made up of employees looking to be engaged. They need to volunteer their time. Successfully complete this audit please allow for two separate meetings. Some additional time may be required for tabulation. (Allow 1 hour per floor per person for this audit)
☐ Meet with your Audit Tiger Team to provide an overview of the TD Centre's Energy Campaign and details of the Electronics Mystery Audit.
☐ Schedule dates for your initial benchmarking audit as well as follow-up audit. Comparison of the two audit results will show any reductions. Dates should be set within TD Centre's Energy Campaign, which runs December 1, 2010 – April 30, 2011. Please note, that this package can be utilized at any time however, in order to be eligible for the draw all audits must be complete and submitted by April 30, 2011.
☐ Order printed material as described below from your tenant relations representative.
☐ Conduct audit.

ACTION | Conduct an Electronics Mystery Audit

Tools for success

TI | Electronics Mystery Audit Instructions

Please note, for accurate results, no notice should be given to employees.

Pre-Audit
☐ Identify areas in your organization where an Electronics Mystery Audit would be beneficial. These could be a department, a floor or your entire organization.
☐ Develop a Tiger Team of volunteers. Hold a meeting with the volunteers and discuss details of the audit and gather input. Do not provide audit details prior to the first meeting to ensure the audit is a surprise to the majority of your employees.

C2 | Sample Script for communications to your organization’s leadership

Please use and adapt the below text for communications to your leadership.

As part of the Energy Campaign being implemented by Cadillac Fairview at the TD Centre, all Tenants are being provided with tools to investigate aspects of our own energy use. The Energy Campaign is an extensive program of events, messaging and Tenant participation that will support the reduction of energy use at TD Centre. It runs from December 1, 2010 to April 30, 2011.

The tools provided support an electronics audit to be carried out at the end of a regular work day. A small group of employees volunteers will count the number of computers, monitors, and
TDC Energy Campaign – Electronic Mystery Audit

Electronic Mystery Audit Worksheet

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Area 1</th>
<th>Area 2</th>
<th>Area 3</th>
<th>Area 4</th>
<th>Area 5</th>
<th>Area 6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>LCD</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Computer</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Laptop</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Cell Phone Charger</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Print this worksheet for all EMAs. Once completed, enter into the online tool once Audit 1 and Audit 2 have been completed.

TRACKING for Audit No. 1

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Area 1</th>
<th>Area 2</th>
<th>Area 3</th>
<th>Area 4</th>
<th>Area 5</th>
<th>Area 6</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>LCD</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Computer</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Laptop</td>
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<td>0</td>
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<td>0.00</td>
</tr>
<tr>
<td>Cell Phone Charger</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.00</td>
</tr>
</tbody>
</table>

ESTIMATED After Hours Electronics Energy Use (expressed in kWh/year) - 0

ESTIMATED Cost of After Hours Electronics Energy Use - $0.00

ASSUMPTIONS:
1. Business Operating Hours of 8:00am - 6:00pm = 14hrs of after hour use
2. Calculations use average electronics consumption as per the EPA (U.S. Environmental Protection Agency)
   - Monitor - CRT: 80 watts
   - Monitor - LCD: 20 watts
   - Computer: Desktop = 120 watts
   - Computer: Laptop = 30 watts
   - Cell Phone Charger = 1.6 watts

For more information on electronics use visit: http://michaelburrus.com/electricity/computers.html

Please submit completed audit results (1 & 2) by April 30, 2011.

ACTION | Conduct an Electronics Mystery Audit

WIN an iPad

YES! Switch the Habit

OOPS! Switch the Habit

MONITOR TURN OFF EVERY NIGHT

Information Visualization in Commercial Buildings
April 13, 2011
ACTION | Turn Off Your Monitor
ACTION | Use the Call-In System to Turn Off the Lights
ACTION | Turn Off the Lights when Leaving a Room
zero-landfill

vs.

zero-waste
**TDC Waste Campaign – Why?**

**Question #6**

*Are you aware of what you can recycle in your workplace?*

**Response...**

<table>
<thead>
<tr>
<th># of respondents</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>489</td>
</tr>
<tr>
<td>no</td>
<td>10</td>
</tr>
<tr>
<td>don’t know</td>
<td>4</td>
</tr>
</tbody>
</table>

**Response...**

<table>
<thead>
<tr>
<th>Item</th>
<th># of respondents</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>plastic spoons &amp; forks</td>
<td>69</td>
<td>14%</td>
</tr>
<tr>
<td>rubber bands</td>
<td>33</td>
<td>7%</td>
</tr>
<tr>
<td>plastic take-out containers</td>
<td>25</td>
<td>5%</td>
</tr>
<tr>
<td>magazines &amp; flyers</td>
<td>482</td>
<td>96%</td>
</tr>
<tr>
<td>tissue</td>
<td>138</td>
<td>27%</td>
</tr>
<tr>
<td>none of these</td>
<td>10</td>
<td>2%</td>
</tr>
</tbody>
</table>
TDC Energy Campaign – Measurement

OVERALL | complex wide energy use pre & post campaigns; normalized for time of year and system upgrades/operational changes

RELAMPING | energy reductions achieved with property wide relamping; expressed bi-annually

LIGHTING HOUR OPT IN | company + building + property wide energy reductions achieved with lighting hour schedule changes

CALL-IN SYSTEM | % of system use increase

MIDNIGHT AUDIT REPORTS | addressing energy use items noted in reports – dependent on tenant feedback

LIGHTING RETROPTS | energy reductions achieved with non-base building lighting retrofits – dependent on tenant feedback

ELECTRONICS MYSTERY AUDIT | energy reductions realized between audit 1 and 2 – dependent on tenant participation & feedback
The Toronto-Dominion Centre is a green community practicing sustainability and leading change in Corporate Canada and the Canadian real estate marketplace. It is the real life story of a business community committed to environmental stewardship.

Green at the TD Centre is about “doing” and making things happen. Green leadership at the TD Centre is ingrained in the fabric of all we do - activities, culture and behaviours, each and every day. It is about operations and practices that contribute to a high performing property for a continued sustainable future.

It is about building sustainability together.
Feedback Tools

Making a difference through conservation and education

KWh HP Watts hE

reset 552.06
Tenant Engagement

| partnerships between LANDLORD + TENANT |

Tenants are:

| engaged in participation beyond meetings |
| sharing their business case |
| acting as advocates |
| reaching out to each other |
| inspired to green their own spaces |
| putting themselves forward to pilot programs – energy, waste, daytime cleaning |
| targeted communications to CxO for ongoing support |
“I want you to know that you are impacting change at AGF and we are reaping the financial and green rewards. As they say, the teacher will come when the student is ready. We are learning a lot and even better, have been able to apply it.”

Nicole Popovich
Vice President, Institutional Development